

NON-PUBLIC?: N
ACCESSION #: 8906130164
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 2 PAGE: 1 OF 05

DOCKET NUMBER: 05000457

TITLE: Manual Reactor Trip Due to Condensate Pump Suction Strainers Plugging
EVENT DATE: 10/25/88 LER #: 88-029-01 REPORT DATE: 05/02/89

OPERATING MODE: 1 POWER LEVEL: 089

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CF
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: John M. Lewand, Technical Staff Engineer Ext. 2400
TELEPHONE: (815)458-2801

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

In accordance with Technical Specifications, RCS Inventory Balance (RCSIB) was being performed once every eight hours. Between 1322 and 1500 on October 25, 1988 all four Condensate/Condensate Booster (CD/CB) pumps were alternately shutdown for suction strainer backwashing. At 1530 the RCSIB was started. In an effort to reduce Feedwater (FW) flow requirements, power was reduced with an unexpected decrease in CD header pressure. At 1602, with Steam Generator levels rapidly decreasing, the reactor was manually tripped. All plant systems operated as designed. At 1709 the RCSIB was terminated, but it was completed within acceptable criteria upon establishment of stable plant conditions. The cause of strainer plugging was deteriorated material from a denim service coat. The main condenser and all four CD pump suction strainers and headers were cleaned and inspected. The 2C CB pump, the 2A heater drain pump and the 2B FW pump suction strainers were inspected, along with the upper and lower areas of the Main Condenser. There have been previous occurrences of plugging of the CD Pump Suction Strainers which have resulted in a reactor trip, but the previous corrective actions are not applicable.

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END OF ABSTRACT

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A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 2; Event Date: October 25, 1988; Event Time: 1602;

Mode: 1 - Power Operation; Rx Power: 89%;

RCS AB! Temperature/Pressure: 580 degrees F/2240 psig

B. DESCRIPTION OF EVENT:

At approximately 1300 on October 25, 1988 Unit 2 was in operation at 89% reactor Power and 1040 megawatts electrical (MWe). The 2A, 2B and 2C Condensate/Condensate Booster (CD/CB) SD! pumps were operating to support feedwater (FW) SJ! system requirements. Process Radiation Monitor 2PRO11J (PR) IL! (RCS Leak Detection Gaseous and Particulate Radiation Monitor Channel) was inoperable, and in accordance with Action C of Technical Specification 3.4.6.1, a Reactor Coolant System Inventory Balance was being performed once every eight hours.

The following events occurred at the times specified:

1322 The 2D CD/CB pump was started and the 2B CD/CB pump was shutdown for suction strainer backwashing.

1329 2B CD/CB pump was started and the 2A CD/CB pump was shutdown for suction strainer backwashing.

1340 2A CD/CB pump was started and 2D CD/CB pump was placed in standby.

1442 2D CD/CB pump was started and the 2A CD/CB pump was shutdown for suction strainer backwashing.

1500 2A CD/CB pump was started and the 2C CD/CB pump was shutdown for CB pump suction strainer backwashing.

1516 2C CD/CB pump was started and the 2B CD/CB pump was shutdown for CD pump suction strainer backwashing. At this time an operating shift foreman was sent to the CD/CB pump pit to examine the debris being flushed from the suction strainers.

1530 An alarm was received at main control panel 2PM03J for high suction strainer differential pressure for the 2A and 2C CD pumps. The Shift Foreman in the CD/CB pump pit reported an insignificant amount of debris being flushed from the 2B CD pump suction strainer. The reason for the strainer plugging could not be determined.

Reactor Coolant System Water Inventory Water Balance (Balance) was started. The Balance was due by 1804 on 10/25/88.

1534 2C CB Pump Suction Strainer High Differential Pressure alarm was received at main control panel 2PM033.

1540 Since no debris could be flushed from the 2B CD pump suction strainer the 2B CD/CB pump was restarted and the 2A CD/CB pump was shutdown for suction strainer backwashing. The Unit Operating Engineer was contacted with a request for load reduction and load reduction was authorized.

1545 Operating made provisions for ramping Unit 2 down to 560 MWe. The Shift Foreman in the CD/CB pump pit reported that backwashing the 2A CD pump suction strainer produced no debris.

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D. DESCRIPTION OF EVENT, Continued:

1550 There were still no positive results from backwashing the 2A CD pump suction strainer. CD/CB system pressures were stable. Operating continued to monitor CD/CB pump suction strainer differential pressures. The Reactor Core was boric in preparation for a load rejection.

1558 The Shift Foreman in the CD/CB pit reported that the 2B CD/CB pump was cavitating. In an effort to reduce feedwater flow requirements, the Unit 2 Nuclear Station Operator (NSO) commenced ramping down from 1040 MWe to 560 MWe at 10 MW/min. An unexpected decrease in CD header pressure was noticed.

1559 The Unit 2 NSO increased the reduction ramp rate to 2000 MW/min. All systems responded normally to the load drop. Steam generator levels recovered from shrink and returned to the 45% narrow range level. CD header pressure was low but stable.

1601 The Unit 2 NSO ramped from 560 MWe at 2000 MW/min to 325 MWe in order to further reduce the FW flow requirements. All systems responded except that CD

header pressure was decreasing. The NSO tripped the 2C FW pump.

1602 CD header pressure indicated 0 psig on the control room pressure indicator. Steam generator levels were at 20-25% narrow range and rapidly decreasing. At 28% power the Unit 2 NSO manually tripped the reactor. The turbine tripped and the 2A and 2B Auxiliary Feedwater (AF) BA! pumps automatically started on low-low steam generator levels.

All plant systems operated as designed, Unit 2 was stabilized at 1606.

1709 The RCS water inventory balance was started at 1530. The reactor trip invalidated the prerequisites required to perform the water inventory balance, thus it was terminated. The water inventory balance was performed with all acceptance criteria met upon establishment of stable plant conditions.

1857 The Reactor Coolant System Water Inventory Balance (due at 1804) was signed off as satisfactorily complete. Leakages were within acceptable criteria.

The appropriate NRC notification via the ENS phone system was made at 1905 on October 25, 1988 pursuant to 10CFR50.73(b)(2)(ii).

This Reactor Trip is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

C. CAUSE OF EVENT:

An internal inspection of the Unit 2 Main Condenser was performed. The deteriorated remains of a denim service coat were found above the tube bundles. The material intact measured approximately 120 x 18". Localized piles of rust and sediment were observed in the lower part of the Condenser.

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C. CAUSE OF EVENT, Continued:

An internal inspection of the condensate pump suction strainers revealed that sediment and a fibrous material were on the screens of all four suction strainers. The fibers would not wash off the screens. An analysis of the fiber removed from the strainers revealed that it was cotton which had traces of dye in it.

The apparent root cause of the strainer plugging event was that deteriorated

material from the denim service coat plugged the CD pump suction strainers.

D. SAFETY ANALYSIS:

The systems and operators were able to safely respond to the event. Since the reactor was manually tripped, and both trains of Auxiliary Feedwater automatically started and supplied water to the steam generators, this event resulted in no safety consequences.

Under worst case conditions at least one train of Auxiliary Feedwater would have been available, and the plant response would have been the same.

The Reactor Coolant system Water Inventory Balance was successfully completed.

E. CORRECTIVE ACTIONS:

The main condenser was thoroughly inspected and cleaned to remove all debris and sediment. All four CD pump suction strainers were cleaned by scraping and burning the fibrous material from the strainer screens. The strainers were inspected and found satisfactorily clean prior to restoring them back to normal. The 2C CB pump, the 2A heater drain pump (HD) SI!, and the 2B FW pump suction strainers were inspected and found satisfactorily clean. The CD suction header was internally inspected and cleaned. A thorough inspection of the upper and lower areas of the condenser was performed prior to closing the manways.

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F. PREVIOUS OCCURRENCES:

There have been previous occurrences of plugging of the Condensate Pump Suction Strainers which have resulted in a reactor trip. The corrective actions were implemented addressing both root and contributing causes. Previous corrective actions are not applicable to this event.

G. COMPONENT FAILURE DATA:

This event was not caused by component failure, nor did any components fail as a result of this event.

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Commonwealth Edison
Braidwood Nuclear Power Station
Route #1, Box 84
Braceville, Illinois 60407
Telephone 815/458-2801

BW/89-593

May 17, 1989

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you as a Supplemental Report to LER 88-029-00.

This report is number 88-029-01; Docket No. 50-457.

Very truly yours,

R. E. Querio
Station Manager
Braidwood Nuclear Station

REQ/PGH/Jfe
(8347z)

Enclosure: Licensee Event Report No. 88-029-01

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

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BWAP 1250-2T4
Revision 0

SUPPLEMENT TO DVR

DVR no.

STA UNIT YEAR No.
D - 20 - 2 - 88 - 180

PART 1 TITLE OF EVENT OCCURRED

Manual Reactor Trip Due To
Condensate Pump Suction Strainers 10-25-88 1602
Plugging DATE TIME

REASON FOR SUPPLEMENTAL REPORT

This supplemental report is being issued to update the description,
cause, corrective actions, and safety analysis.

PART 2

ACCEPTANCE BY STATION REVIEW

DATE

SUPPLEMENTAL REPORT APPROVED
AND AUTHORIZED FOR
DISTRIBUTION

7048P (061086)

*** END OF DOCUMENT ***
